

## Gunter, Jason

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**From:** Seabourne, Rocky <rseabourne@doerun.com>  
**Sent:** Tuesday, December 15, 2015 8:02 AM  
**To:** 'brandon.wiles@dnr.mo.gov'; Gunter, Jason; 'martin.kator@dnr.mo.gov'; Montgomery, Michael; Neaville, Chris; Ty Morris; Yingling, Mark  
**Subject:** Emailing: November progress report  
**Attachments:** November progress report.pdf; 10 - Remediation Air Report - October 2015.pdf

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November progress report

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# **Monthly Ambient Air Monitoring Report**

The Doe Run Company  
Old Lead Belt Sites:  
Federal, Rivermines, National, and Leadwood

**October-2015**



SUITE 300  
1801 PARK 270 DRIVE  
ST. LOUIS, MO 63146

# Federal Site

Sample Results for **October-2015**

	St. Joe (Ballfields)		Big River#4		Water Treatment Plant	
Sample Date	TSP ug/m3	Lead ug/m3	TSP ug/m3	Lead ug/m3	TSP ug/m3	Lead ug/m3
10/1/15	29	0.007	49	0.007	33	0.014
10/2/15	28	0.007	49	0.007	invalid	invalid
10/5/15	33	0.021	34	0.007	17	0.013
10/6/15	26	0.021	invalid	invalid	invalid	invalid
10/7/15	25	0.021	invalid	invalid	40	0.132
10/8/15	19	0.007	21	0.013	20	0.028
10/9/15	19	0.014	16	0.007	16	0.007
10/12/15	53	0.043	48	0.007	47	0.056
10/13/15	23	0.007	25	0.007	26	0.048
10/14/15	35	0.014	32	0.013	31	0.021
10/15/15	47	0.007	invalid	invalid	46	0.014
10/16/15	37	0.007	invalid	invalid	invalid	invalid
10/19/15	54	0.014	11	0.000	54	0.014
10/20/15	36	0.014	61	0.034	invalid	invalid
10/21/15	32	0.000	43	0.007	invalid	invalid
10/22/15	invalid	invalid	40	0.007	invalid	invalid
10/23/15	19	0.007	9	0.007	invalid	invalid
10/26/15	19	0.007	18	0.007	invalid	invalid
10/27/15	6	0.007	3	0.000	invalid	invalid
10/28/15	15	0.021	13	0.007	invalid	invalid
10/29/15	13	0.007	12	0.007	invalid	invalid
10/30/15	7	0.007	11	0.007	invalid	invalid

Monthly Avg. TSP	27	28	33
Monthly Avg. Pb	0.012	0.008	0.035
Sep-15	0.011	0.014	0.012
Aug-15	0.012	0.012	0.021
<b>Rolling 3-Month</b>	<b>0.012</b>	<b>0.011</b>	<b>0.022</b>

Three month rolling average must be less than 0.15 ug/m3

	Big River QA	
Sample Date	TSP ug/m3	Lead ug/m3
10/1/15	49	0.007
10/6/15	invalid	invalid
10/8/15	invalid	invalid
10/13/15	invalid	invalid
10/15/15	invalid	invalid
10/20/15	60	0.026
10/22/15	38	0.013
10/27/15	4	0.000
10/29/15	na	na

## Notes

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utility company service upgrade.

Big River QA sample from 10/29/15 was missing.



## Rivermines

Sample Results for **October-2015**

	Big River #4		Rivermines South #1		Rivermines North #2		Rivermines East #3	
Sample Date	TSP ug/m3	Lead ug/m3	TSP ug/m3	Lead ug/m3	TSP ug/m3	Lead ug/m3	TSP ug/m3	Lead ug/m3
10/1/15	49	0.007	98	0.248	invalid	invalid	33	0.014
10/2/15	49	0.007	invalid	invalid	invalid	invalid	invalid	invalid
10/5/15	34	0.007	89	0.334	15	0.007	17	0.013
10/6/15	invalid	invalid	invalid	invalid	invalid	invalid	invalid	invalid
10/7/15	invalid	invalid	103	0.352	31	0.053	40	0.132
10/8/15	21	0.013	invalid	invalid	20	0.007	20	0.028
10/9/15	16	0.007	21	0.020	19	0.007	16	0.007
10/12/15	48	0.007	71	0.055	45	0.007	47	0.056
10/13/15	25	0.007	60	0.116	38	0.075	26	0.048
10/14/15	32	0.013	75	0.189	32	0.007	31	0.021
10/15/15	invalid	invalid	90	0.195	43	0.007	46	0.014
10/16/15	invalid	invalid	83	0.195	31	0.006	invalid	invalid
10/19/15	11	0.000	46	0.013	50	0.046	54	0.014
10/20/15	61	0.034	56	0.013	60	0.087	invalid	invalid
10/21/15	43	0.007	59	0.035	42	0.042	invalid	invalid
10/22/15	40	0.007	39	0.013	36	0.020	invalid	invalid
10/23/15	9	0.007	10	0.007	10	0.027	invalid	invalid
10/26/15	18	0.007	16	0.013	15	0.007	invalid	invalid
10/27/15	3	0.000	6	0.007	3	0.007	invalid	invalid
10/28/15	13	0.007	12	0.013	9	0.013	invalid	invalid
10/29/15	12	0.007	46	0.062	12	0.013	invalid	invalid
10/30/15	11	0.007	9	0.007	10	0.007	invalid	invalid

Monthly Avg. TSP	28	52	27	33
Monthly Avg. Pb	0.008	0.099	0.023	0.035
Sep-15	0.014	0.077	0.028	0.012
Aug-15	0.012	0.068	0.012	0.021
<b>Rolling 3-Month</b>	<b>0.011</b>	<b>0.081</b>	<b>0.021</b>	<b>0.022</b>

Three month rolling average must be less than 0.15 ug/m3

	Big River QA	
Sample Date	TSP ug/m3	Lead ug/m3
10/1/15	49	0.007
10/6/15	invalid	invalid
10/8/15	invalid	invalid
10/13/15	invalid	invalid
10/15/15	invalid	invalid
10/20/15	60	0.026
10/22/15	38	0.013
10/27/15	4	0.000
10/29/15	na	na

### Notes

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utility company service upgrade.

Big River QA sample from 10/29/15 was missing.



## Federal Site

Sample Results for **October-2015**

	St. Joe (Ballfields)	Big River#4	Water Treatment
Sample Date	PM10 (ug/m3)	PM10 (ug/m3)	PM10 (ug/m3)
10/3/15	invalid	27	invalid
10/6/15	20	19	23
10/9/15	21	32	14
10/12/15	30	30	26
10/15/15	27	21	27
10/18/15	33	31	30
10/21/15	29	27	invalid
10/24/15	10	13	11
10/27/15	6	2	invalid
10/30/15	7	11	invalid

*Compliance with NAAQS is less than 150 ug/m3*

<b>Monthly Avg. PM10</b>	20	21	22
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	Big River QA
Sample Date	PM10 (ug/m3)
10/3/15	21
10/9/15	16
10/15/15	15
10/21/15	30
10/27/15	8

### Notes:

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utility company service upgrade.

## Rivermines

Sample Results for **October-2015**

	Big River #4	Rivermines South #1	Rivermines North #2	Rivermines East #3
Sample Date	PM10 (ug/m3)	PM10 (ug/m3)	PM10 (ug/m3)	PM10 (ug/m3)
10/3/15	27	invalid	invalid	invalid
10/6/15	19	41	invalid	23
10/9/15	32	invalid	invalid	14
10/12/15	30	36	11	26
10/15/15	21	8	4	27
10/18/15	31	7	32	30
10/21/15	27	3	30	invalid
10/24/15	13	4	11	11
10/27/15	2	3	4	invalid
10/30/15	11	10	7	invalid

Compliance with NAAQS is less than 150 ug/m3

<b>Monthly Avg. PM10</b>	21	14	14	22
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	Big River QA
Sample Date	PM10 (ug/m3)
10/3/15	21
10/9/15	16
10/15/15	15
10/21/15	30
10/27/15	8

### Notes:

Electrical connections have all been upgraded to code. Water Treatment Plant site is awaiting utility company service upgrade.

## Meterological Data - Old Lead Belt

### October-2015

24hr average

Date	Wind Speed (MPH)	Wind Direction	Sigma-Theta	Temperature ( C )	Air Pressure (mmHg)	Rain (Inches)	Power Supply (Volts)
01-Oct-15	4.208	0.047	23.17	12.73	748	0	13.38
02-Oct-15	5.184	3.901	22.6	12.72	748	0	13.42
03-Oct-15	4.666	12.46	21.8	10.65	745	0	13.46
04-Oct-15	4.696	355	22.55	11.21	747	0	13.45
05-Oct-15	2.188	318.3	22.17	14.48	748	0	13.41
06-Oct-15	2	311.2	25.94	17.8	748	0	13.33
07-Oct-15	1.367	268	27.58	17.19	748	0	13.34
08-Oct-15	1.712	236.3	27.36	19.33	746	0	13.29
09-Oct-15	3.426	331.3	25.4	15.91	748	0.06	13.35
10-Oct-15	1.672	210.2	33.66	13.14	749	0	13.35
11-Oct-15	4.142	204.2	22.24	17.09	742	0	13.36
12-Oct-15	2.804	256.8	27.1	20.13	738	0	13.28
13-Oct-15	2.587	272.6	30.33	15.19	742	0	13.34
14-Oct-15	2.645	240.5	25.77	13.42	745	0	13.36
15-Oct-15	3.099	253	26.28	16.4	747	0	13.35
16-Oct-15	4.085	295.9	20.39	11.27	753	0	13.37
17-Oct-15	2.718	341.6	25.54	5.749	756	0	13.5
18-Oct-15	2.431	169.6	29.29	7.89	756	0	13.5
19-Oct-15	5.597	194.7	20.27	15.4	750	0	13.4
20-Oct-15	6.467	203.4	20.29	19.13	749	0	13.33
21-Oct-15	3.841	206.7	25.31	20.77	749	0	13.28
22-Oct-15	2.522	173.8	25.27	19.47	749	0	13.29
23-Oct-15	6.121	194.3	23.15	18.62	745	0	13.33
24-Oct-15	4.953	271.4	22.51	17.53	745	0	13.32
25-Oct-15	2.414	40.38	23.02	10.58	752	0	13.43
26-Oct-15	3.417	86.1	23.16	11.48	749	0	13.43
27-Oct-15	3.069	107.4	26.07	14.12	741	0.58	13.41
28-Oct-15	3.714	256.5	21.82	13.41	737	0.03	13.41
29-Oct-15	2.801	248.8	21.65	7.05	743	0	13.5
30-Oct-15	2.605	155.2	28.42	8.1	746	0.01	13.51
31-Oct-15	5.081	204.1	20.9	12.88	741	0.25	13.47



**INQUEST**  
ENVIRONMENTAL INC.

3609 Mojave Ct., Ste E ♦ COLUMBIA, MO 65202  
(573) 474-8110 ♦ FAX: (573) 474-8371

August 28, 2015

Mr. Greg Henson  
Chemist  
The Doe Run Company  
881 Main Street  
Herculaneum, Missouri 63048

RE: Park Hill Monitoring Network 3rd Quarter 2015 Lead/PM10 Samplers and  
Meteorological System Performance Audit Report.

Dear Mr. Henson,

Please find enclosed the worksheets detailing the Lead/PM10 sampler's one-point flow verifications and meteorological sensors accuracy checks that were recently performed on the Doe Run Park Hills Monitoring Network. A copy of the current certifications for the audit devices that were used has also been enclosed.

All of the verifications and checks were found to be within expected guidelines.

After reviewing the enclosed information, please feel free to call with any comments or questions. Thank you for your business.

Sincerely,



John A. Kunkel  
Inquest Environmental, Inc.

## **PM10 Sampler Verifications**

**INQUEST**  
Environmental, Inc.**PM10 Sampler Audit**  
**Volumetric Flow Control**3609 Mojave Court, Suite E  
Columbia, Missouri 65202  
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River	Intercept (Qa)	-0.00876
Sampler	#4 Primary PM10	Temperature	28.3 °C 301.5 °K
Flow Controller	P2952	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Flow Rate	Acceptable
Manometer	Flow Rate	Manometer	Pressure	Press. Ratio	Flow Rate	Percent	Range
"H <sub>2</sub> O	m <sup>3</sup> /min	"H <sub>2</sub> O	(Pf)	(Po/Pa)	m <sup>3</sup> /min	Difference	
3.30	1.105	25.40	47.44	0.938	1.139	3.08	± 7%

Sampler Operating Flow Rate						
Manometer	Pressure	Press. Ratio	Flow Rate	Corrected	Design %	Acceptable
"H <sub>2</sub> O	(Pf)	(Po/Pa)	m <sup>3</sup> /min	Flow Rate	Difference	Range
25.60	47.81	0.937	1.138	1.103	-2.39	± 10%

**Calculations:**Pressure mmHg (Pf) - ("H<sub>2</sub>O/13.6) \* 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13\*100



# INQUEST Environmental, Inc.

## PM10 Sampler Audit Volumetric Flow Control

3609 Mojave Court, Suite E  
Columbia, Missouri 65202  
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River	Intercept (Qa)	-0.00876
Sampler	#4 QA PM10	Temperature	28.3 °C 301.5 °K
Flow Controller	P1019	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.40	1.121	27.10	50.61	0.934	1.147	2.32	± 7%

Sampler Operating Flow Rate						
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Design % Difference	Acceptable Range
27.10	50.61	0.934	1.147	1.120	-0.88	± 10%

### Calculations:

Pressure mmHg (Pf) - ("H<sub>2</sub>O/13.6) \* 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13\*100

Date	January 20, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	St Joe Park	Intercept (Qa)	-0.00876
Sampler	#4 PM10	Temperature	31.8 °C 305.0 °K
Flow Controller	P4353	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.10	1.077	24.90	46.50	0.939	1.136	5.48	± 7%

Sampler Operating Flow Rate						
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Design % Difference	Acceptable Range
24.90	46.50	0.939	1.136	1.074	-4.96	± 10%

**Calculations:**

Pressure mmHg (Pf) - ("H<sub>2</sub>O/13.6) \* 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13\*100

**INQUEST**  
Environmental, Inc.**PM10 Sampler Audit**  
**Volumetric Flow Control**3609 Mojave Court, Suite E  
Columbia, Missouri 65202  
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Wtr Plnt)	Intercept (Qa)	-0.00876
Sampler	#3 PM10	Temperature	31.8 °C 305.0 °K
Flow Controller	P2951	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Flow Rate	Acceptable
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Percent Difference	Range
3.10	1.077	25.50	47.63	0.938	1.147	6.50	± 7%

Sampler Operating Flow Rate						
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Design % Difference	Acceptable Range
25.60	47.81	0.937	1.146	1.072	-5.13	± 10%

**Calculations:**Pressure mmHg (Pf) - ("H<sub>2</sub>O/13.6) \* 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13\*100



Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Quarry)	Intercept (Qa)	-0.00876
Sampler	#1 PM10	Temperature	31.8 °C 305.0 °K
Flow Controller	P4601	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.30	1.111	24.60	45.94	0.940	1.121	<b>0.90</b>	± 7%

Sampler Operating Flow Rate						
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Design % Difference	Acceptable Range
24.50	45.76	0.940	1.121	1.111	<b>-1.68</b>	± 10%

**Calculations:**

Pressure mmHg (Pf) - ("H<sub>2</sub>O/13.6) \* 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13\*100

**INQUEST**  
Environmental, Inc.**PM10 Sampler Audit**  
**Volumetric Flow Control**3609 Mojave Court, Suite E  
Columbia, Missouri 65202  
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Above Quarry)	Intercept (Qa)	-0.00876
Sampler	#2 PM10	Temperature	31.8 °C 305.0 °K
Flow Controller	P4507	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Flow Rate Percent Difference	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.30	1.111	26.00	48.56	0.936	1.136	<b>2.25</b>	± 7%

Sampler Operating Flow Rate						
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Design % Difference	Acceptable Range
26.10	48.75	0.936	1.136	1.110	<b>-1.77</b>	± 10%

**Calculations:**Pressure mmHg (Pf) - ("H<sub>2</sub>O/13.6) \* 25.4

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Flow Rate Percent Difference- (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Percent Difference)/100)

Design Percent Difference- (Corrected Flow Rate-1.13)/1.13\*100

## **Lead/TSP Sampler Verifications**



**INQUEST**  
Environmental, Inc.**Lead Sampler Audit**  
**Volumetric Flow Control**3609 Mojave Court, Suite E  
Columbia, Missouri 65202  
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River Primary	Intercept (Qa)	-0.00876
Sampler	#4 TSP	Temperature	28.3 °C 301.5 °K
Flow Controller	P4557	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.85	1.193	23.90	44.65	0.942	1.239	3.86	± 7%

Sampler Operating Flow Rate					
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Acceptable Range
23.00	42.97	0.944	1.242	1.194	1.10 - 1.70

**Calculations:**Pressure mmHg (Pf) - "H<sub>2</sub>O \* 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Calibration Error)/100)

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Big River QA	Intercept (Qa)	-0.00876
Sampler	#4 TSP	Temperature	28.3 °C 301.5 °K
Flow Controller	P4558	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.90	1.200	23.10	43.16	0.944	1.237	3.08	± 7%

Sampler Operating Flow Rate					
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Acceptable Range
23.10	43.16	0.944	1.237	1.199	1.10 - 1.70

**Calculations:**

Pressure mmHg (Pf) - "H<sub>2</sub>O \* 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Calibration Error)/100)

**INQUEST**  
Environmental, Inc.**Lead Sampler Audit**  
**Volumetric Flow Control**3609 Mojave Court, Suite E  
Columbia, Missouri 65202  
573-474-8110

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	St Joe Park	Intercept (Qa)	-0.00876
Sampler	#4 TSP	Temperature	31.8 °C 305.0 °K
Flow Controller	P6792	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.70	1.176	22.60	42.22	0.945	1.242	5.61	± 7%

Sampler Operating Flow Rate					
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Acceptable Range
22.90	42.78	0.944	1.241	1.171	1.10 - 1.70

**Calculations:**Pressure mmHg (Pf) - "H<sub>2</sub>O \* 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Calibration Error)/100)



Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Water Plant)	Intercept (Qa)	-0.00876
Sampler	TSP	Temperature	31.8 °C 305.0 °K
Flow Controller	P4475	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.70	1.176	24.40	45.59	0.940	1.232	4.76	± 7%

Sampler Operating Flow Rate					
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Acceptable Range
24.50	45.77	0.940	1.232	1.173	1.10 - 1.70

**Calculations:**

Pressure mmHg (Pf) - "H<sub>2</sub>O \* 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Calibration Error)/100)

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (Quarry)	Intercept (Qa)	-0.00876
Sampler	#1 TSP	Temperature	31.8 °C 305.0 °K
Flow Controller	P2940	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.60	1.160	23.70	44.28	0.942	1.240	6.90	± 7%

Sampler Operating Flow Rate					
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Acceptable Range
23.20	43.35	0.943	1.241	1.155	1.10 - 1.70

**Calculations:**

Pressure mmHg (Pf) - "H<sub>2</sub>O \* 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Calibration Error)/100)

Date	July 29, 2015	Auditor	John Kunkel
Operator	The Doe Run Company	Transfer Orifice	1882
Location	Park Hills Network	Slope (Qa)	1.04094
Station	Rivermines (above quarry)	Intercept (Qa)	-0.00876
Sampler	#1 TSP	Temperature	31.8 °C 305.0 °K
Flow Controller	P2941	Station Pressure	30.08 "Hg 764.0 mmHg

Flow Rate Audit							
Transfer Orifice		Sampler				Calibration Error %	Acceptable Range
Manometer "H <sub>2</sub> O	Flow Rate m <sup>3</sup> /min	Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min		
3.70	1.176	23.20	43.35	0.943	1.243	5.70	± 7%

Sampler Operating Flow Rate					
Manometer "H <sub>2</sub> O	Pressure (Pf)	Press. Ratio (Po/Pa)	Flow Rate m <sup>3</sup> /min	Corrected Flow Rate	Acceptable Range
22.90	42.78	0.944	1.244	1.173	1.10 - 1.70

**Calculations:**

Pressure mmHg (Pf) - "H<sub>2</sub>O \* 1.86832

Pressure Ratio (Po/Pa) - 1-Pf/Pa

Orifice Flow Rate (Qa) - 1/Slope\*( Sqrt("H<sub>2</sub>O\*( Ta/Pa))-Intercept)

Sampler Flow Rate (Qa) - Taken from the look-up tables

Calibration Error - (Sampler Flow-Orifice Flow)/Orifice Flow\*100

Corrected Flow Rate - Operating Flow\*((100-Calibration Error)/100)



## **Calibration Orifice Certification Worksheet**



TISCH ENVIRONMENTAL, INC.  
 145 SOUTH MIAMI AVE  
 VILLAGE OF CLEVELAND, OH  
 44102  
 513.467.9000  
 877.263.7610 TOLL FREE  
 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5028A

Date - Jan 13, 2015 Rootmeter S/N 9833620 Ta (K) - 292  
 Operator Tisch Orifice I.D. - 1882 Pa (mm) - 765.81

PLATE OR VDC #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2C (in.)
1	NA	NA	1.00	1.3360	4.3	1.50
2	NA	NA	1.00	1.0560	6.8	2.50
3	NA	NA	1.00	0.9570	8.2	3.00
4	NA	NA	1.00	0.8870	9.5	3.50
5	NA	NA	1.00	0.6670	16.5	6.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0225	0.7654	1.2420	0.9943	0.7443	0.7553
1.0191	0.9651	1.6034	0.9910	0.9385	0.9763
1.0173	1.0630	1.7564	0.9892	1.0337	1.0695
1.0155	1.1449	1.8972	0.9875	1.1133	1.1552
1.0061	1.5084	2.4840	0.9784	1.4668	1.5125
Qstd slope (m) = 1.66236			Qa slope (m) = 1.04094		
intercept (b) = -0.01438			intercept (b) = -0.00876		
coefficient (r) = 0.99927			coefficient (r) = 0.99927		
y axis = SQRT[H2O(Pa/760)(298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)  
 Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]  
 Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{ [SQRT(H2O(Pa/760)(298/Ta))] - b}  
 Qa = 1/m{ [SQRT H2O(Ta/Pa)] - b}

## **Meteorological Sensor's Accuracy Checks**



# Inquest Environmental, Inc.

## Wind Direction Sensor Performance Audit

Operator The Doe Run Co.  
 Location Big River  
 Station Name Meteorological System  
 Technician J Kunkel / M Kunkel

Date 07/29/2015  
 Start Time 10:30  
 Stop Time 11:30

Sensor Mfg RM Young  
 Sensor Model Wind Monitor AQ  
 Serial Number 128618  
 Sensor Height 10.0 Meters

Station Declination 1.1 Deg  
 Measured Angle 180.0 Deg  
 Corrected Angle 181.1 Deg  
 Alignment Error -1.1 Deg

Vane Angle	Data Logger	Results	
		Difference ± 3 Deg Limit	Total Error ± 5 Deg Limit
Degrees	Degrees		
0/360	1.1	1.1	0.0
90	91.9	1.9	0.8
180	181.1	1.1	0.0
270	271.9	1.9	0.8

Average Difference (Degrees)	1.5
Average Total Error (Degrees)	0.4

Audit Device	Wind Vane Alignment	Direction
Type	Pocket Transit	Vane Angle Fixture
Mfg.	Brunton	R.M. Young
Model	5008	18212
Serial No.	5080304492	None

Comments: Wind direction was verified by determining the orientation of the sensor in respect to True North. This was measured using a tri-pod mounted transit aligned along the length of the sensor while locked from rotating. A magnetic declination of 1.1 degrees was used to determine True North. The linearity of the sensor was determined by aligning the sensor to an indexed test fixture provided by the manufacturer. The four cardinal directions were verified using the fixture. No adjustments were made to the sensor.

# Inquest Environmental, Inc.

## Wind Speed Sensor Performance Audit

Operator The Doe Run Co.  
 Location Big River  
 Station Name Meteorological System  
 Auditor(s) J Kunkel / M Kunkel

Date 07/29/2015  
 Start Time 10:30  
 Stop Time 11:30

Sensor Mfg RM Young  
 Sensor Model Wind Monitor AQ  
 Serial Number 128618  
 Sensor Height 10.0 Meters

Audit Standard		DAS Response		Limit	± (0.25 m/s + 5%)
RPM	M/S	M/S	Difference	M/S	
Zero	0.00	0.00	0.00	0.25	
300	1.54	1.56	0.02	0.25	
600	3.07	3.07	0.00	0.25	
1200	6.14	6.15	0.01	0.56	
1800	9.22	9.21	-0.01	0.71	
3600	18.43	18.44	0.01	1.17	
5400	27.65	27.63	-0.02	1.63	
7200	36.86	36.85	-0.01	2.09	
Average			0.00		

Audit Device	Anemometer Drive
Type	Variable Speed
Mfg.	R.M. Young
Model	18801
Serial No.	CAO1631

Comments: Wind speed was verified using a variable speed anemometer drive. The propellor was removed from the sensor and the drive was connected using a flexible connector. The sensor was then rotated in the appropriate direction at several different speeds. Sensor responses were taken from the data logger. No adjustments were made to the sensor.

# Inquest Environmental, Inc.

## Temperature Sensor Performance Audit

Operator The Doe Run Co.  
 Location Big River  
 Station Name Meteorological System  
 Technician J Kunkel / M Kunkel

Date 07/29/2015  
 Start Time 10:30  
 Stop Time 11:30

### Sensor Information

Sensor Mfg Climatronics  
 Sensor Model NA  
 Serial Number NA  
 Sensor Height 2 meters

Audit Device °C	Sensor	
	Data Logger °C	Difference °C
0.5	0.5	0.0
34.1	33.9	-0.2
44.0	43.9	-0.1
Average		-0.1

Note: The limit for each point is +/- 0.5 °C

Audit Device	
Type	Digital Thermometer
Mfg.	Control Company
Model	15-077-8
Serial No.	221381405

Comments: The temperature is verified by co-locating the sensor with a certified digital thermometer. The verification is conducted at three levels using two water baths (iced and hot water) and the ambient temperature. The sensor error was determined by comparing the sensor's data logger response to the display on the certified digital thermometer. No adjustments were made to the sensor.



# Inquest Environmental, Inc.

## Barometric Pressure Sensor Performance Audit

Operator The Doe Run Co.  
 Location Big River  
 Station Name Meteorological System  
 Technician J Kunkel / M Kunkel

Date 07/29/2015  
 Start Time 10:30  
 Stop Time 11:30

Sensor Mfg Setra  
 Sensor Model 276  
 Serial Number 2626447

Audit Device	Data Logger Response	
	BP	Difference
mm HG	mm HG	mm HG
741.20	744.60	3.40

Note: Limit is +/- 7.5 mm HG.

Audit Device	
Type	Digital Barometer
Mfg.	AIR
Model	AIR-HB-1A
Serial No.	6G3745

Comments: The barometric pressure is verified by co-locating the sensor with a certified digital barometer. The verification was conducted at one level after allowing the sensor and calibration device ample time to stabilize.  
The sensor error was determined by comparing the sensor's data logger response to the display on the certified digital barometer. No adjustments were made to the sensor.



# Inquest Environmental, Inc.

## Precipitation Gauge Performance Audit

Operator The Doe Run Co  
 Location Big River  
 Station Name Meteorological System  
 Technician J Kunkel / M Kunkel

Date 07/29/2015  
 Start Time 10:30  
 Stop Time 11:30

Sensor Mfg Texas Electronics  
 Sensor Model TR525I  
 Serial Number 36611-805  
 Diameter (inches) 6.00

Audit Device	Data Logger Response	
	Gauge Tips	Difference %
Known Tips		
96.00	90.00	-6.25

Note: Limit is +/- 10%.

Audit Device	
Type	Graduated Beaker
Mfg.	Texas Instruments
Model	FC-525
Serial No.	NA

Comments: The precipitation gauge output was verified using a field calibration kit  
supplied by the manufacturer. The kit consists of a graduated beaker  
and a calibration funnel using a precision orifice at the water outlet.  
Water was measured in the beaker and poured into the funnel while  
mounted on the gauge. The amount of precipitation recorded by the  
data logger was then compared to the known amount of water passing  
through the funnel. 100 tips equals one inch of rainfall. The gauge  
was cleaned and no adjustments were made.

## **Meteorological Audit Devices Certifications**

# BRUNTON OUTDOOR GROUP

## CERTIFICATE OF CALIBRATION

### Equipment Owner

Name: Inquest Environmental Mitch Kunkel  
Address: 3609 Majestic Court, Ste E  
Columbia, MO 65207

Calibration traceable to the National Institute of Standards and Technology in accordance with MIL-STD-45662A has been accomplished on the instrument listed below by comparison with standards maintained by the Brunton Outdoor Group. The accuracy and stability of all standards maintained by the Brunton Outdoor Group are traceable to national standards maintained by the National Institute of Standards and Technology in Washington, D.C. and Boulder, CO. Completed record of all work performed is maintained by the Brunton Outdoor Group and is available for inspection upon request.

This unit has been calibrated to Lietz TM10E serial number 30937 traceable to N.B.S. Number 738227675 this July Day 30 20 14.

Description Pocket Transit

Purchase Order 256430329

Order Number 50-070367

Model Number F-5008

Serial Number 5080304492

Calibration Date 7/30/14

Recalibration Date 7/30/15

Signed Eli Appleby 7/30/14

Quality Control Coordinator



**CALIBRATION PROCEDURE**  
**18801/18810 ANEMOMETER DRIVE**

**DWG: CP18801(A)**

REV: C101107 PAGE: 2 of 4  
BY: TJT DATE: 10/11/07  
CHK: JC W.C. GAS-12

**CERTIFICATE OF CALIBRATION AND TESTING**

MODEL: **18801** (Comprised of Models 18820 Control Unit & 18830 Motor Assembly)  
SERIAL NUMBER: **CA01631**

R. M. Young Company certifies that the above equipment was inspected and calibrated prior to shipment in accordance with established manufacturing and testing procedures. Standards established by R.M. Young Company for calibrating the measuring and test equipment used in controlling product quality are traceable to the National Institute of Standards and Technology.

Nominal Motor Rpm	Output Frequency Hz (1)	Calculated Rpm (2)	Indicated Rpm (3)
600	320	600	600
1200	640	1200	1200
2400	1280	2400	2400
4200	2240	4200	4200
6,000	3200	6000	6000
8,100	4320	8100	8100
9,900	5280	9900	9900
<input checked="" type="checkbox"/> Clockwise and Counterclockwise rotation verified			

- (1) Measured at the optical encoder output.  
(2) Frequency output produces 32 pulses per revolution of motor shaft.  
(3) Indicated on the Control Unit LCD display.

\* Indicates out of tolerance

☒ No Calibration Adjustments Required ☐ As Found ☐ As Left

Traceable frequency meter used in calibration Model: DP5740 SN: 4863

Date of inspection 10 Dec 2014  
Inspection Interval One Year

Tested By EC





Calibration  
Certificate No. 1750.01

Calibration complies with ISO/IEC  
17025, ANSI/NCSL Z540-1, and 9001



Cert. No.: 4000-6726396

### Traceable® Certificate of Calibration for Digital Thermometer

Cust ID: Inquest Environmental Inc., 3609 Mojave Court, Suite E, Columbia, MO 65202 U.S.A. (RMA:995292)

#### Instrument Identification:

Model Numbers: 15-077-8, 11705843 S/N: 221381404 Manufacturer: Control Company

Model: 15-077-7 S/N: 51202300

#### Standards/Equipment:

Description	Serial Number	Due Date	NIST Traceable Reference
Temperature Calibration Bath TC-179	A45240		
Thermistor Module	A17118	3/03/16	1000371058
Temperature Probe	3039	4/02/16	15-A0P2S-20-1
Temperature Calibration Bath TC-231	A79341		
Thermistor Module	A27129	11/04/15	1000365407
Temperature Probe	5202	11/19/16	6-CV9Y2-1-1
Temperature Calibration Bath TC-309	B3A444		
Thermistor Module	A27129	11/04/15	1000365407
Temperature Probe	5267	11/19/16	6-CV9Y0-1-1

#### Certificate Information:

Technician: 68

Procedure: CAL-06

Cal Date: 4/28/15

Due Date: 4/28/16

Test Conditions: 22.4°C 47.0 %RH 1012 mBar

#### Calibration Data:

Unit(s)	Nominal	As Found	In Tol	Nominal	As Left	In Tol	Min	Max	±U	TUR
°C	-0.001	0.011	Y	-0.001	-0.001	Y	-0.051	0.049	0.013	3.8:1
°C	24.999	24.999	Y	24.999	25.000	Y	24.949	25.049	0.014	3.6:1
°C	60.003	60.007	Y	60.003	60.001	Y	59.953	60.053	0.014	3.6:1
°C	100.000	100.012	Y	100.000	100.004	Y	99.950	100.050	0.014	3.6:1

This Instrument was calibrated using Instruments Traceable to National Institute of Standards and Technology.

A Test Uncertainty Ratio of at least 4:1 is maintained unless otherwise stated and is calculated using the expanded measurement uncertainty. Uncertainty evaluation includes the instrument under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level. In tolerance conditions are based on test results falling within specified limits with no reduction by the uncertainty of the measurement. The results contained herein relate only to the item calibrated. This certificate shall not be reproduced except in full, without written approval of Control Company.

Nominal=Standard's Reading; As Left=Instrument's Reading; In Tol=In Tolerance; Min/Max=Acceptance Range; ±U=Expanded Measurement Uncertainty; TUR=Test Uncertainty Ratio; Accuracy=±(Max-Min)/2; Min = As Left Nominal(Rounded) - Tolerance; Max = As Left Nominal(Rounded) + Tolerance; Date=MM/DD/YY

*Nicol Rodriguez*  
Nicol Rodriguez, Quality Manager

*Aaron Judice*  
Aaron Judice, Technical Manager

#### Maintaining Accuracy:

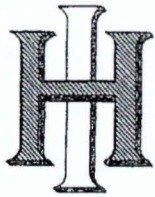
In our opinion once calibrated your Digital Thermometer should maintain its accuracy. There is no exact way to determine how long calibration will be maintained. Digital Thermometers change little, if any at all, but can be affected by aging, temperature, shock, and contamination.

#### Recalibration:

For factory calibration and re-certification traceable to National Institute of Standards and Technology contact Control Company.

CONTROL COMPANY 4455 Rex Road Friendswood, TX 77546 USA  
Phone 281 482-1714 Fax 281 482-9448 service@control3.com www.control3.com

Control Company is an ISO 17025:2005 Calibration Laboratory Accredited by (A2LA) American Association for Laboratory Accreditation, Certificate No. 1750.01.  
Control Company is ISO 9001:2008 Quality Certified by (DNV) Det Norske Veritas, Certificate No. CERT-01805-2006-AQ-HOU-RVA  
International Laboratory Accreditation Cooperation (ILAC) - Multilateral Recognition Arrangement (MRA).



# HASS INSTRUMENT CORPORATION

6711 OLD BRANCH AVENUE • CAMP SPRINGS, MD 20748-6990 • (301) 449-5454 • FAX (301) 449-5455

## CALIBRATION REPORT

BAROMETER/ALTIMETER  
AIR Model AIR-HB-1A  
Serial No. 6G3745

<u>TEST POINT</u>	<u>TEST PRESSURE</u>	<u>DIGITAL READOUT</u>	<u>READOUT ERROR</u>	<u>CORRECTION REQUIRED</u>
1	930.00	931.9	+1.9	-1.9
2	970.00	971.9	+1.9	-1.9
3	1010.00	1011.9	+1.9	-1.9
4	1050.00	1051.9	+1.9	-1.9
5	1011.97	1013.9	+1.9	-1.9

### NOTES:

1. All data are in Millibars (hPa) and were taken at 70 F (21 C).
2. To correct the Digital Readout of the instrument, either algebraically add the CORRECTION REQUIRED to, or algebraically subtract the READOUT ERROR from, the readout shown on the instrument.
3. The TEST PRESSURE was generated using Type A-1 Barometer S/N 3327, and was approached in an increasing-pressure direction.
4. The TEST PRESSURE for TEST POINT 5 was ambient atmospheric pressure.
5. The BAROMETER/ALTIMETER was horizontal during the calibration.
6. The LCD screen of the BAROMETER/ALTIMETER has some trash in the center of the display, but it does not interfere with the readout.
7. Although the Digital Readout of the instrument can be adjusted to incorporate the average CORRECTION REQUIRED, this has not been done.

Calibration Date: 10 March 2015

By: Bernard I. Hass

(SEAL)

Bernard I. Hass



Remediation Group

**Rock Seabourne**  
**General Supervisor Land and Remediation**  
**rseabourne@doerun.com**

December 10, 2015

Mr. Jason Gunter  
Remedial Project Manager  
U.S. Environmental Protection Agency  
Region 7 - Superfund Branch  
11201 Renner Blvd.  
Lenexa, KS 66219

**Re: The Doe Run Company – Federal Mine Tailings Site Monthly Progress Report**

Dear Mr. Gunter:

As required by Article XVII, Paragraph 73 of the Administrative Order on Consent (Docket No.VII-97-F-0009) for the referenced project and on behalf of The Doe Run Company, the progress report for the period November 1, 2015 through November 30, 2015 is enclosed. If you have any questions or comments, please call me at 573-244-8136.

Sincerely,

Rocky Seabourne  
General Supervisor Land and Remediation

Enclosure

- c: Mark Yingling – TDRC (electronic only)
- Chris Neaville – TDRC (electronic only)
- Michael Montgomery – TDRC (electronic only)
- Martin Kator – MDNR DSP
- Brandon Wiles – MDNR HWP
- Ty Morris – Barr Engineering

35 Iron County Rd. #1, Viburnum, MO 65566  
Telephone: (573) 244-8136



**Federal Mine Tailings Site**

Park Hills, Missouri

**Monthly Progress Report**

Period: November 1, 2015 – November 30, 2015

**1. Actions Performed or Completed This Period:**

- a. Work continued on the development of the Removal Action Report.
- b. Work continued on design modifications to address the erosion issues in the Shaw Branch Creek Area and Former Chat Pile Area.
- c. Work began on the design of two additional dry ponds, one in the southern ORV Area and one between the Borrow Area and ORV Area.

**2. Data and Results Received This Period:**

- a. During this period, the ambient air monitoring samples for October were processed and the Ambient Air Monitoring Report for October 2015 was completed and is attached.

**3. Planned Activities for Next Period:**

- a. Address any comments received from MDNR-DSP to the Post-Removal Site Control Plan for the site.
- b. Continue developing the Removal Action Report.
- c. Continue the development of the design modifications to address the erosion issues in the Shaw Branch Creek Area and Former Chat Pile Area.
- d. Continue the design of the additional two dry ponds.

**4. Changes in Personnel:**

- a. None.

**5. Issues or Problems Encountered and the Resolution:**

- a. None.